

ENCOUNTER 2002 EXPEDITION TO THE ISLES OF ST FRANCIS,  
SOUTH AUSTRALIA: *MYZOSTOMA AUSTRALE* (MYZOSTOMIDA),  
A NEW CRINOID ASSOCIATED WORM FROM SOUTH AUSTRALIA

by G. W. ROUSE<sup>1</sup>

Summary

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No Myzostomida have been described from southern Australian waters. Most of the described myzostome taxa to date have been found in the warmer waters of the Indo-Pacific, where their crinoid echinoderm hosts are most diverse. In this paper a new myzostome, *Myzostoma australe* n. sp., is described from the crinoid *Philonema macronema* (Müller 1846) (Philonetridae) taken from waters off the Nuyts Archipelago, near Ceduna, South Australia. *Myzostoma australe* is an ectocommensal on *P. macronema* and somewhat resembles other *Myzostoma* informally placed as the ‘*amblygnathus*’ group by Grygier (1990). It differs from these in having a markedly ellipsoidal body with an oval arrangement of parapodia displaced forward, combined with the anterior two pairs and posterior pair of cirri being longer than the rest. There has previously been no myzostome recorded from any species of *Philonema*.

Key Words: Symbiont, Comasteridae, Crinoidea, Echinodermata, Annelida

Introduction

Myzostomida is a small taxon comprising around 150 described nominal species. Currently there is debate on the overall position of the group, with authors variously favouring a position among polychaetes (Rouse & Pleijel 2001), or outside annelids and closer to platyhelminths (Eeckhaut *et al.* 2000) or rotifers (Zrzavý *et al.* 2001). Myzostomida are all obligate symbionts, mainly with crinoids but some with other echinoderms. Many are mobile and roam over the host, stealing food from it, but others remain sessile near a convenient ‘feeding’ site. Some induce the host to form galls or cysts around them, while others are endoparasitic, living in the gut lumen, coelom, or gonads of their host (Grygier 2000; Rouse & Pleijel 2001). There is a wide range of body forms in the group, with flattened oval or disc-like forms being predominant; however, many are elongate, ridged, or having extensions of the body that allow them, for example, to resemble the pinnules of their crinoid hosts. Mobile myzostomes also show a wonderful diversity of colour patterns that generally match those of their hosts. Myzostomida are mainly found where crinoid diversity is greatest, namely coral reef environments, and more than 100 described species are known from the Indo-Pacific (see Grygier 1990; 2000).

Myzostome diversity is low in colder waters, with, for instance, only a few known from the well-studied European waters. For Australian waters, Grygier (2000) stated that there are about 70 described and

undescribed species of *Myzostoma* present in museum collections, 60 of these occurring in waters of the Great Barrier Reef, Northern Territory and Western Australian north of Shark Bay. Grygier (2000) noted that the temperate coasts of Australia have relatively few myzostome species (~13 between Fraser Island and Perth); Grygier (1990) indicated the presence of one species in South Australia, but did not describe or name it. Here a new myzostome taxon is described from specimens of the crinoid *Philonema macronema* (Müller, 1846) taken in waters off the Nuyts Archipelago, South Australia. This represents the first description of a myzostome from southern Australian waters. The present species is distinct from that noted by Grygier (1990) in South Australia (his species no. 37) which occurs on the comasterid crinoid *Cenolia trichoptera* (Müller, 1846) (M.J. Grygier, pers. comm.).

Materials and Methods

Crinoid hosts were collected by hand while diving with SCUBA or trawled by the RV *Ngerin* over the period of 22–23 February 2002. Worms were collected from living crinoids placed under a Leica MZ-8 stereomicroscope. Living worms were photographed using a JVC-XC3 digital camera. The worms were then relaxed in a magnesium chloride solution before being fixed in 10% formalin in seawater. After 24 hours the specimens were rinsed in freshwater and placed in 70% ethanol. A parapodium from the 4th ‘segment’ was removed from a paratype and observed in glycerine under interference contrast microscopy with a Leica DMR microscope. Those studied with scanning electron microscopy (SEM) were dehydrated in ethanol and

<sup>1</sup>Marine Invertebrates, South Australian Museum, North Terrace, SA 5000 Australia

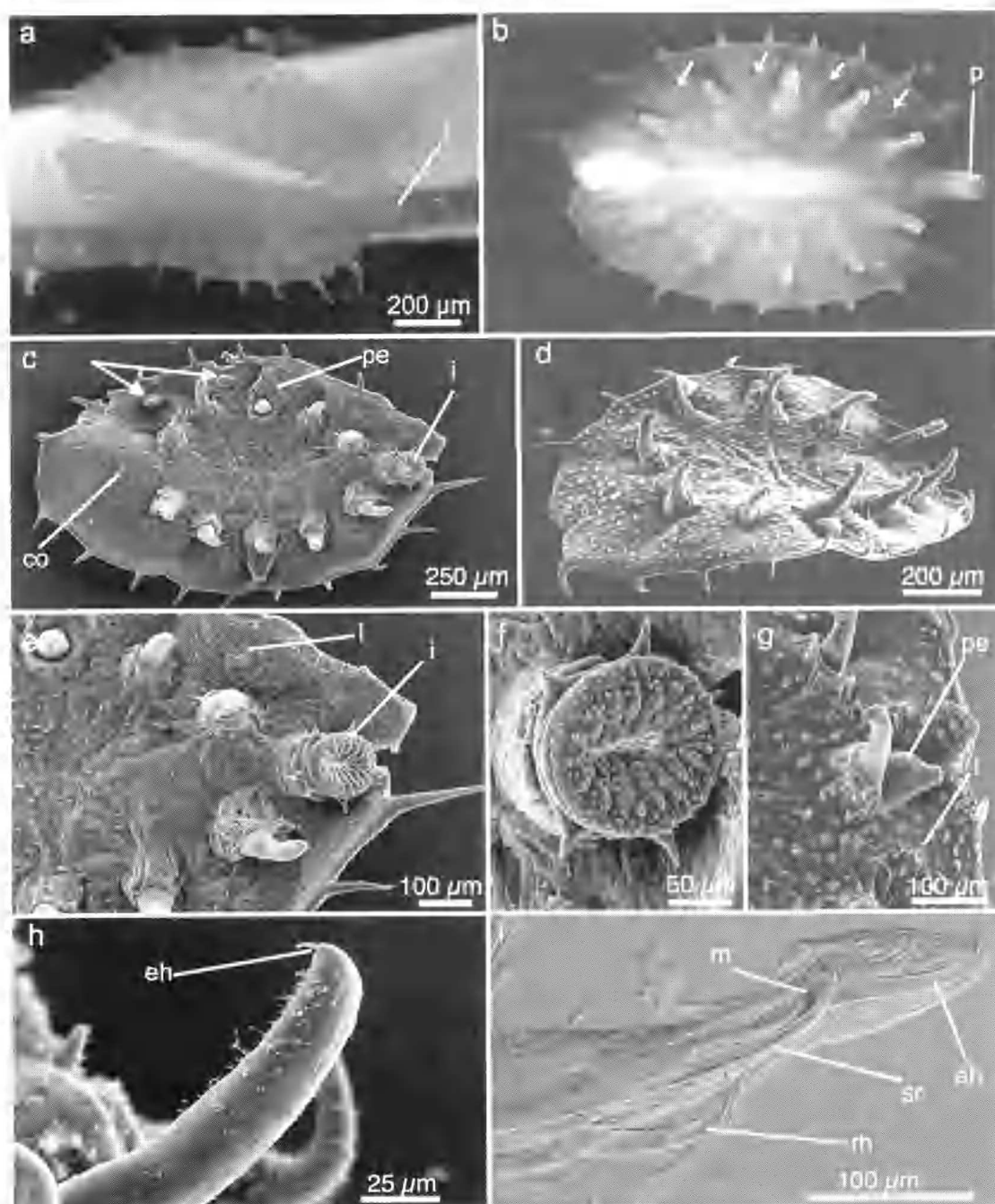


Fig. 1. a. Dorsal view of holotype (SAM E3348) while still alive and on a pinnule of its erinoid host *Philometra macrinemus*. The introvert (i) is partly everted. The right posterior-most cirrus (10) is lacking. b. Ventral view of living specimen showing oval arrangement of parapodia and everted introvert (i). The four arrows indicate the location of the lateral organs on one side of the body. c. SEM ventral view of paratype (SAM F3551) showing elongate opening (co), partly everted penes (pe), and everted introvert (i). Two everted lateral organs are indicated by arrows. d. SEM ventro-lateral view of paratype (SAM F3551) showing the elongate parapodia and ventral patches of cilia. e. SEM ventral view of anterior end of paratype (SAM F3551) showing everted introvert (i) and first lateral organ (l). f. SEM ventral view of everted introvert of paratype (SAM F3551) showing three pairs of buccal papillae. The first left papilla 3 is lacking. g. SEM ventral view of mid-region of paratype (SAM F3551) showing partly everted penis (pe) at base of parapodium 3, and lateral organ (l) lying between parapodia 3 and 4. h. SEM view of parapodium 3 of paratype (SAM F3551) showing emergent hook (eh). i. Differential interference contrast micrograph of parapodium 4 of paratype (SAM F3349) showing aërcula (support rod, sr) with manubrium (m), emergent hook (eh), and replacement hook (rh).

then critical point dried using  $\text{CO}_2$ . They were then coated with gold and viewed using a Philips XL-20 scanning electron microscope.

## Results

### *Taxonomy of Myzostoma australe n. sp.*

#### *Material Examined:*

##### *Holotype*

(SAM E3348) in 70% ethanol, found on *Ptilometra macronema* (Müller, 1846) at 19 m depth off North Point of St. Francis Island, Nuyts Archipelago, S.A. (32° 29' 37.0" S; 133° 16' 55.6" E), G. Rouse, 22-2-2002.

##### *Paratypes*

1 (SAM E3349) in 70% ethanol; same collection details as holotype; 1 (SAM E3350) in 70% ethanol, found on *P. macronema* dredged at ~50 m, depth off Nuyts Archipelago, S.A. (32° 30' 04.8" S; 133° 19' 08.3" S), G. Rouse, 23-2-2002; 2 (SAM E3351) on SEM stub; same collection details as holotype.

#### *Etymology*

From the Latin (gender neutral) *austral*, south, referring to the country and southern occurrence of this taxon.

#### *Diagnosis*

Small myzostomes with flattened, ellipsoidal body elongated posteriorly. Ten pairs of thin marginal cirri, with cirri 1, 2, and 10 several times longer than shortest lateral cirri. Introvert with 3 pairs of buccal papillae, pouch opening in front of first parapodia, close to body margin. Parapodia acirrate, elongate, arranged in ellipse ahead of mid-body region. Penes extending at least 100  $\mu\text{m}$ . Four pairs of small lateral organs located between parapodia and body margin. Emergent hooks of parapodia with moderately thick shaft, tip curving 90°. Acicula shorter and thinner than emergent hooks, manubrium on one side only. Simultaneous hermaphrodites. Ectocommensals.

#### *Description*

Body ellipsoid and flat, with long axis antero-posterior. Holotype 1.2 mm long, 0.6 mm wide (Fig. 1a). Paratypes ranging from 1 to 2 mm long and 0.6 to 1.0 mm wide. Ventral side with ciliated patches (Fig. 1d), flat with thin ridges extending from center to parapodia (Fig. 1c). Ten pairs of fine marginal cirri, with cirri 1, 2, and 10 two to three times longer than shortest lateral cirri. Lateral cirri gradually becoming longer toward front and rear (Figs 1a, b, d). Opening of introvert pouch small and ventral, closer to parapodia 1 than to anterior margin. Introvert capable of protruding to equivalent to 20%

of body length (Fig. 1b). Three pairs of buccal papillae (Fig. 1f). Cloacal opening for digestive tract and female genital duct one-third of way from last parapodia to rear margin. Colour in life red with mid-dorsal longitudinal white stripe or with scattered patches of white blotches on red. Colour of preserved specimens white. Parapodia set in antero-posteriorly elongate ellipse lying distinctly ahead of mid-body, last pair at about 65% of body length (Figs 1b, c, d). Parapodia each lying about one-third in from body margin to center of oval (Figs 1b, c, d). Each parapodium with conical base lacking cirrus, and with slender, elongate (up to 200  $\mu\text{m}$  when extended), finger-like distal part (Fig. 1d). Pair of penes at lateral bases of parapodia 3 capable of protruding at least 100  $\mu\text{m}$  (Figs 1e, d, g). Four pairs of inconspicuous lateral organs alternating with parapodia, their openings visible as round holes between parapodia and body margin (Figs 1b, c, g). One paratype with two lateral organs everted (Fig. 1e). Emergent hook shafts moderately thick, with distal fifth bowed slightly outward; tip short, sharp, and curving 90° (Figs 1h, i). Acicula (support rod) of each parapodium shorter than hook and two-thirds as thick; manubrium rectangular, developed on one side of shaft (Fig. 1j), with three small lobes along drawn-out inner margin. One replacement hook found in each parapodium (Fig. 1i).

## Discussion

There has been no previous record of myzostomes on any species of *Ptilometra*, the only genus in Ptilometridae. This genus of erinoids is restricted to southern Australian waters (Rowe & Gates 1995) and contains only *Ptilometra australis* (Wilton, 1845) and *Ptilometra macronema*. *Myzostoma australe* may belong near the *ambiguum* group of *Myzostoma* as identified by Grygier (1990). This group is characterized by having a flat, round to shield-shaped body, with the anterior and posterior one to two pairs of marginal cirri much longer than the others. Grygier (1990) named the following nominal taxa in this group: *Myzostoma ambiguum* Grall, 1887, *Myzostoma antennatum* Grall, 1884, *M. longicirrum* Grall, 1887, *M. longimanum* Jägersten, 1937 and *M. vastum* Grall, 1883, with all but the last found in Pacific waters. A subsequent description of *M. singaporense* Eeckhaut *et al.*, 1994 from Singapore, has compared another taxon to this *ambiguum* group (Eeckhaut *et al.* 1994). *Myzostoma australe* is easily distinguished by its distinctly ellipsoidal shape with the oval arrangement of parapodia displaced forward, combined with the anterior two pairs and posterior pair of cirri being longer than the rest. All other taxa in the *ambiguum* group have rounded or kite-shaped bodies and much

longer posterior and anterior cirri. *Myzostoma singaporense* appears to be the closest morphologically to *M. australe* n. sp. but has a more rounded body and has two anterior and two posterior pairs of elongate cirri.

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